DETAILED ACTION

Specification

1.   The disclosure is objected to because it contains an embedded hyperlink and/or

other form of browser-executable code. Applicant is required to delete the embedded

hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating
      obviousness or nonobviousness.

3.   Claims 1, 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Neff et al., *Very Low Bit Rate Video Coding Based on Matching Pursuits* in view of

Frossard et al., *A Posteriori Quantized Matching Pursuit.*

As to **claim 1**, Neff teaches video coding method of exploiting the temporal redundancy between successive frames in a video sequence, comprising the steps wherein a reference frame, called an I frame (3.4 Intraframe coding), is first approximated by a collection of basis function, called atoms (Neff discloses where), and wherein either the atoms (fig. 2a, element find atoms) are quantized, entropy coded (fig. 2a, element code atoms) and sent to a decoder (fig. 2a, output of code atoms to fig 2b, decode bitstream) or the original frame is encoded (fig. 2) and transmitted to the decoder using any frame codec (fig. 2b) and wherein following predicted frames, called P-frames , are approximated by the geometric transformations of the basis functions (atoms) describing the previous frame (Neff teaches where after the motion prediction image is formed, it is subtracted from the original image to produce the motion residual. This residual is coded using the matching pursuit technique introduced in section 2, see 3.2 Matching Residual Coding. Therefore, it is clear to the Examiner that Neff discloses to predict frames using a matching pursuit algorithm which is composed of atoms, which reads upon the claimed limitation) and that the parameters of the geometric transformation (the matching pursuit algorithm is the used to decompose the motion residual signal into coded dictionary functions which are called functions, see 3 Detailed System Description) are, entropy coded (fig. 1a element code atoms) and sent to a decoder (fig. 1a output of element code atoms which is input to decode bitstream) in order to reconstruct the predicted frames (fig. 1b output of element current recon.).

Neff is silent in regards to a reference frame called an I frame, and either the atoms are quantized, and predicted frames, called P-frames.

However, Frossard teaches the atoms are quantized (Moreover, if the dictionary is very large to ensure a good convergence or even if it contains real parameters, the atoms should be quantized before transmission see pg. 14 IV. Signal Reconstruction Error and pg 23 VI. Quantization of Structured Atoms Indexes).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Frossard with Neff for providing improved image processing.

As to **claim** 4, Neff (modified by Frossard) as a whole teaches everything as claimed above, see claim 1. In addition, Neff teaches the video coding method according to claim 1, wherein the parameters and coefficients of the atoms are entropy coded ((Neff teaches when the atom decomposition of a single residual frame is found, it is important to code the resulting parameters efficiently, see Coding Atom Parameters pg. 369 and fig. 2a element code atoms).

Neff is silent in regards to the parameters and coefficients of the atoms are quantized.

However, Frossard teaches the atoms are quantized (Moreover, if the dictionary is very large to ensure a good convergence or even if it contains real parameters, the atoms should be quantized before transmission see pg. 14 IV. Signal Reconstruction Error and pg 23 VI. Quantization of Structured Atoms Indexes).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Frossard with Neff for providing improved image quality.

As to **claim 5,** Neff (modified by Frossard) as a whole teaches everything as claimed above, see claim 4. In addition, Neff teaches video coding method according to claim 4, wherein the quantization of the parameters and the coefficients vary across time and the variation is controlled by a rate control unit (see. 3.3 Buffer Regulation).

As to **claim 6,** Neff (modified by Frossard) as a whole teaches everything as claimed above, see claim 1. In addition, Neff teaches video coding method according to claim 1, wherein the method is used together with a residual frame based texture codec that encodes the differences between the original frames and the ones reconstructed using the compensated atoms (see 3.2 Matching-Pursuit Residual Coding).

4.   Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neff et al., *Very Low Bit Rate Video Coding Based on Matching Pursuits* in view of Frossard et al., *A Posteriori Quantized Matching Pursuit* and further in view of Well Known Prior Art (Official Notice).

As to **claim 7,** Neff (modified by Frossard) as a whole teaches everything as claimed above, see claim 1. Neff is silent in regards to video coding method according

to claim 1, wherein the geometric features (atoms) of the I-frame are computed from the quantized frames at the encoder and decoder and are not transmitted.

However, Official Notice is taken that both the advantage of concept of proving the limitations as claimed are notoriously well known and expected in the art, thus it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the limitations as claimed with Neff (modified by Frossard) for providing improved image quality.

As to **claim 8**, Neff (modified by Frossard) as a whole teaches everything as claimed above, see claim 1. Neff is silent in regards to video coding method according to claim 1, wherein the geometric features (atoms) are re-computed after each quantized frame at the encoder and decoder and replace the previous prediction.

However, Official Notice is taken that both the advantage and concept of providing the limitations as claimed are notoriously well known and expected in the art and would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate with Neff (modified by Frossard) for providing improved image quality.

Allowable Subject Matter

1.   Claims 2-3 and 9-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2.   The following is a statement of reasons for the indication of allowable subject

matter: Te present invention as claimed involves a video coding method according to

claim 1, wherein the I-frame is approximated by a linear combination of N atoms

g.sub..gamma.n(x, y): I .function. (x , y) = n = 0 N - 1 .times. c n .times. g .gamma.

.times. .times. n .function. (x , y) ,selected in a redundant, structured library and

indexed by a string of parameters .gamma..sub.n representing the geometric

transformations applied to the generating mother function g(x,y) where the c.sub.n are

weighting coefficients.

Conclusion

3.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

4.   Sekiguhi et al, US-7,245,659

5.   Kopet et al., US-5,448,310

6.   Vleeschouwer et al., US-2002/0114393 A1.

        Any inquiry concerning this communication or earlier communications from the

examiner should be directed to JESSICA ROBERTS whose telephone number is

(571)270-1821. The examiner can normally be reached on 7:30-5:00 EST Monday-

Friday, Alt Friday off.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Marsha D. Banks-Harold can be reached on (571) 272-7905. The fax

phone number for the organization where this application or proceeding is assigned is

571-273-8300.

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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